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Notes:

1. Untranslatable words are replaced with asterisks (****).
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CLAIM + DETAILED DESCRIPTION

[Claim(s)]

[Claim 1]In a manufacturing method of coated paper for printing applied twice [at least], the major axis application liquid which contains paints and adhesives in stencil paper as a paints ingredient, [3.0-5.0 micrometers] Lower coating application liquid which contained in paints a needlelike or pillar-shaped precipitated calcium carbonate light which has a minor axis in within the limits which is 0.2-0.5 micrometer 60 to 90weight % is prepared, A manufacturing method of coated paper for offset printing characterized by carrying out a glazing application after applying this lower coating application liquid on the surface of stencil paper with a film transfer system.

[Claim 2]A manufacturing method of the coated paper for offset printing according to claim 1, wherein B type viscosity (30 **, 60 rpm) of lower coating application liquid is 30 - 150 mPa-s.

[Claim 3]A manufacturing method of the coated paper for offset printing according to claim 1 or 2, wherein a needlelike or pillar-shaped precipitated calcium carbonate light is manufactured in a caustification process of a pulp manufacturing process by sulfate method or a soda process.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]In manufacture of the coated paper which applies the application liquid containing paints and adhesives to stencil paper twice [at least], this invention relates to the manufacturing method of the coated paper for offset printing which carries out a glazing application, after carrying out the lower coating application of the application liquid with a film transfer system.

[0002]

[Description of the Prior Art]The demand in the aiming at advertisement [, such as a

throwaway, a catalog, a pamphlet, and direct mail,] and advertisement commercial-in print sheet printing field is extended in recent years. Although the commodity value of itself is low, since it is important for these commercial printings that the purpose is attained as an advertisement medium, the good thing of a printing result has been called for at low cost. Especially, in the field of the catalog for mail orders, there are amendment of postage, etc. and the paper used for a cost cut is also going to the weight saving further. However, since opacity and a printing reverse side omission pose a problem so that a weight saving is carried out, paper with few printing reverse side omissions is called for by nearby quantity opacity in the amount of low tsubos. In the case of a throwaway and a catalog use, since it will become problems (a claim, returned goods, etc.) if the color of printed matter and thing is different, the good paper of a high degree of whiteness of color reproduction nature is called for.

[0003]**** (white carbon.) with big specific surface area as a means which generally raises opacity (a scattering coefficient, a **** coefficient) There are methods, such as increase of use of fine powder silica etc., use of **** with a high refractive index and paints (a titanium dioxide, a satin white, etc.), the use (a plastic pigment, delaminated clay, etc.) of paints that forms a bulky coating layer, and use of mechanical pulp. However, generally, these **** and paints have a high price, and the viscosity of application liquid also tends to become high and has a problem inferior to operability. When mechanical pulp is used, a degree of whiteness is inferior. Then, it is in the tendency for many methods of using the precipitated calcium carbonate light which has specific shape (a spindle shape, a column, needlelike **) for ***** in stencil paper or the paints for application liquid in consideration of synthetic quality balance and operability to be adopted especially as lightweight coated paper in recent years.

[0004]In order to satisfy the demand of the latest flourishing lightweight coated paper like the above, it is also important technical problem to raise productivity by a paper maker, with high quality maintained, and to aim at a cost cut. Therefore, more inexpensive materials and medicine are used and also it is becoming important to manufacture the product excellent in cost competitiveness by (1) high speed double-width[(2)]-ized (3) on-line production-ized (integrated production from paper making to application and surface finish) (4) multilayer application-ization etc. After carrying out the on-machine application of the lower coating application liquid which includes inexpensive paints in stencil paper as a production facility corresponding to these with a film transfer system, many methods which apply glazing application liquid are being adopted, and these much more improvement in the speed is called for. However, gate roll coater, a blade or rod metaling size press KOTA used by an on-machine application method is used, When carrying out the lower coating application of the usual paints application liquid at stencil paper at high speed, in a blade or rod metaling size press KOTA, there is a phenomenon called mist in which application liquid becomes fog-like and disperses at an application roll NIP exit. Although mist also begins to generate a low

speed depending on an operational provision, it soils a circumference roll, and also when dry solidification is carried out, it falls to a paper face, and serves as a product defect at the same time the extent causes aggravation of increase and work environment so that it becomes high-speed conditions. moreover -- if also in the case of gate roll coater the mechanical stability of application liquid is inferior at the same time the problem of the same mist generating arises -- between an inner roll and an outer roll -- or, The phenomenon called the gum rise which application liquid congeals and adheres to a roll surface by **** which is applied between an inner roll and the roll with which the diameter of a roll differs from **** mutually like [between applicator rolls], and which is not carried out arises, and operability is reduced. Although these problems can be reduced by reducing application liquid concentration, since dry load is increased, and also the permeate lump to the stencil paper of application liquid increases and stencil paper covering nature is inferior, the gloss nonuniformity after a glazing application increases and there is a problem to which the shape of a field and printing aptitude fall.

[0005]In a double [this invention persons] coating, the major axis is 4.0 micrometers or less as a paints ingredient of lower coating application liquid, When a minor axis used a pillar-shaped precipitated calcium carbonate light of 0.5 micrometer or less 50weight % or more, the method of improving the opacity of the coated paper for gravure printings, a printing reverse side omission, and a degree of whiteness was found out (JP,H6-73698,A). However, the method with which lower coating application liquid applies art currently concretely indicated as a desirable thing in this gazette is a blade method.

The major axis was 1.0-3.0 micrometers, and the paints used were precipitated calcium carbonate lights in which a minor axis has the distribution which is 0.1-0.3 micrometer. When these paints are applied to a film transfer application method, there is a problem in the quality as operability and coated paper for offset printing.

[0006]

[Problem to be solved by the invention]In manufacture of the coated paper which applies the application liquid in which SUBJECT of this invention contains paints and adhesives in stencil paper twice [at least] in view of the above situations, It is in providing the manufacturing method of the coated paper for offset printing which can manufacture the product which was excellent in the operability at the time of carrying out the lower coating application of the application liquid with the film transfer system like the above, and was excellent in the opacity after a glazing application, a printing reverse side omission, a degree of whiteness, and dry intensity at low cost.

[0007]

[Means for solving problem]In the manufacturing method of the coated paper for offset printing which applies the application liquid containing paints and adhesives to stencil paper twice [at least] as a result of this invention persons' repeating research wholeheartedly about above-

mentioned SUBJECT, the major axis is 3.0-5.0 micrometers as a paints ingredient, After the minor axis prepared the lower coating application liquid which contained in paints the needlelike or pillar-shaped precipitated calcium carbonate light in within the limits which is 0.2-0.5 micrometer 60 to 90weight % and applied this lower coating application liquid on the surface of stencil paper with the film transfer system, it came to accomplish this invention by carrying out a glazing application.

[0008]The details of an invention are shown below.

[0009]In this invention, the major axis is 3.0-5.0 micrometers as a paints ingredient of lower coating application liquid, and the opacity of coated paper, a printing reverse side omission, and a degree of whiteness can be improved by using the needlelike or pillar-shaped precipitated calcium carbonate light which has a minor axis in within the limits which is 0.2-0.5 micrometer, since ***** is low, and the diameter of a particle is small and this has large specific surface area as compared with an unfixed-shaped thing -- the ratio of paper -- it is because a scattering coefficient improves and opacity and a printing reverse side omission are excellent. Since the granular material itself is a high degree of whiteness as compared with other paints, the degree of whiteness of coated paper also improves. When a minor axis used a needlelike or pillar-shaped precipitated calcium carbonate light smaller than 0.2 micrometer, the problem which application liquid viscosity becomes high too much, and occur an exfoliation pattern frequently at the time of a lower coating application arose, and it was above remarkable by 1100-m/in application speed especially. when [the case where the minor axis of a precipitated calcium carbonate light is larger than 0.5 micrometer, or when the major axis is larger than 5.0 micrometers] -- a ratio -- a scattering coefficient falls and opacity falls. When the major axis is shorter than 3.0 micrometers, dry intensity falls.

[0010]The content of the precipitated calcium carbonate light of this invention is 60 to 90weight % of a range in lower coating paints. In being less than 60 weight %, opacity falls. The water holding property of application liquid falls, when 90 weight % is exceeded, at the time of a lower coating application, on an application roll, paints are taken, roll dirt is occurred frequently or dry intensity falls.

[0011]As a result of examining the viscosity of lower coating application liquid in detail, the value of No.3 rotor (30 **, 60 rpm) of the B-type-viscosity meter in 35% of solid content concentration has preferred 30 - 150 mPa-s. When the B type viscosity of application liquid became higher than 150 mPa-s, it was easy to generate boiling which is the phenomenon of winning a bubble by the application liquid pound of the roll NIP inlet section which supplies application liquid. Since the bubble won by the application liquid pound becomes difficult to escape from this, it is considered that generating of boiling becomes large. If boiling becomes intense, application liquid will disperse around, a surrounding device and machinery will be soiled remarkably, and it will interfere with operation. Generating of boiling was few

tendencies, so that correlation with the application liquid viscosity under ***** with a problem of this boiling low to an exfoliation pattern being so good that the application liquid viscosity under ***** which does not carry out high being low which is not carried out was high and B type viscosity was low. However, when B type viscosity becomes low from 30 mPa-s, application liquid sinks into stencil paper too much, and the surface nature and the shape of a field after an application fall easily.

[0012]As for the precipitated calcium carbonate light which has the specific shape specified by this invention, it is preferred like the above to use what was manufactured at the caustification process of the pulp manufacturing process by the sulfate method or a soda process. A caustification process is a process for changing the sodium carbonate in green liquor into sodium hydroxide which is **** medicine, and it consists of a slaking reaction (1) which changes quicklime into slaked lime, and a caustification reaction (2) which mixes green liquor with slaked lime and generates sodium hydroxide and calcium carbonate. The liquid obtained by the caustification reaction is called white liquid, is separated and made clear with calcium carbonate, and is sent to a **** process. The precipitated calcium carbonate light used by this invention carries out separation recovery, and water washing is fully carried out.

[0013]

$\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$ (1) : Slaking reaction $\text{Ca}(\text{OH})_2 + \text{Na}_2\text{CO}_3 \rightarrow \text{CaCO}_3 + 2\text{NaOH}$ (2) : [Since the calcium carbonate of caustification ***** is a by-product at the time of manufacturing the white liquid which has calcium hydroxide which is a main product,] It is an advantage that it can manufacture at low cost very much compared with the precipitated calcium carbonate light obtained by the method by the reaction of the conventional milk of lime and carbon dioxide.

[0014]As mentioned above, the first quality coated paper for offset printing to be a very low manufacturing cost and for it be [was excellent in the operability in a film transfer system, and] excellent in opacity, a printing reverse side omission, a degree of whiteness, and dry intensity can be manufactured by using the precipitated calcium carbonate light which has specific shape.

[0015]

[Mode for carrying out the invention][in this invention] [the paints used for application liquid] In addition to said precipitated calcium carbonate light, the lime stone powder for general paper manufacture, Other light carbonic acid power RUSHIUMU, power Orrin, clay, delaminated clay, Organic colors, such as inorganic pigments, such as talc, a satin white, silica, barium sulfate, calcium sulfate, a zinc oxide, and a titanium dioxide, and a plastic pigment, etc. can be used, and if needed, these paints can be independent or can be used by two or more sort mixture. As paints of glazing application liquid, it is preferred to contain 40 or more copies of kaolin.

[0016]In this invention, one sort or two sorts or more are chosen and used for the adhesives

used for application liquid if needed from latex or other water borne adhesive. As latex, conjugate diene system copolymer latex, such as a styrene butadiene copolymer and a methacrylate butadiene copolymer, Vinyl system polymer latex, such as a polymer of acrylic ester and/or methacrylate ester or a copolymer, or these are further denatured by functional group content monomers, such as a carboxyl group.

[0017][as water borne adhesive other than latex] For example, protein, such as casein, soybean protein, and synthetic protein; Polyvinyl alcohol, Synthetic resin glue, such as poly vinyl pyrrolidone, OREFIN and maleic anhydride resin, and melamine resin; Oxidization starch, Etherification starch, such as etherification starch, such as positive starch and urea phosphoric acid etherification starch, and hydroxy ethyl ether-ized starch, Starch, such as dextrin; they are the usual adhesives for coatings, such as cellulose derivatives, such as carboxymethyl cellulose, hydroxyethyl cellulose, and hydroxymethyl cellulose.

[0018]The various auxiliary agents blended with the usual paints for coated paper, such as a dispersing agent, a thickener, a water retention agent, an antifoaming agent, and a water resistance-ized agent, may be used for the application liquid of this invention. As for lower coating application liquid concentration, it is preferred that it is 34 to 45% of within the limits. In exceeding 45%, it is easy to generate boiling and an exfoliation pattern. In being lower than 34%, application liquid sinks into stencil paper too much, and is in the tendency which is inferior the surface nature after an application, and in the shape of a field.

[0019]It is desirable, and the stencil paper of the amount 30 of tsubos - 100 g/m^2 used for the common coated paper for printing as stencil paper of this invention uses paper of fine quality and inside ****, choosing for the purpose.

[0020]Gate roll coater, a blade, or rod metaling size press KOTA can be used for the coating apparatus of the film transfer system used for a lower coating application. Although blade KOTA, bar KOTA, a roll coater, air knife KOTA, a reverse roll coater, curtain KOTA, etc. can be used for a glazing application, it is preferred to mainly use a roll application type or fountain nozzle type blade KOTA.

[0021]As for the amount of applications of lower coating application liquid, it is preferred to apply in the range of $2 - 8 \text{ g/m}^2$ by solid content per one side of stencil paper. When applying quantity smaller than 2 g/m^2 , a lowering colander is not obtained sharply but, as a result, stencil paper covering nature and the shape of a field fall a limit on a device to application liquid concentration easily. When applying more quantity than 8 g/m^2 , while it is necessary to make application liquid concentration high conversely and control of the amount of -ed [device glazing] becomes difficult in this case, it is because it becomes easy to generate crepe-like field roughness and a roll pattern in a paper face.

[0022]About a glazing application, as for concentration of glazing application liquid, 60 to 68

weight % is preferred, and the amount of applications usually has 6 - 14 g/m² preferred at solid content per one side. in addition -- in this invention -- a glazing application and a lower coating application -- respectively -- much more -- or two or more layers may be provided.

[0023]Like usual, gloss attachment is made like finishers, such as remaining as it is or a super calender, and a soft calendar, and coated paper by which application dryness was carried out as mentioned above in glazing application liquid is manufactured.

[0024]

[Working example]Although an embodiment is given to below and this invention is concretely shown in it, this invention does not receive restrictions at all by these. A part in an example and % show weight section and weight %, respectively.

[0025]<A quality evaluation method> (One) precipitated-calcium-carbonate-light form observation: Flush filtration of the output was carried out and shape and a minor axis, and major-axis average value were measured with an after-dryness scanning electron microscope (JEOL JSM-5300).

[0026](2) A blank paper degree of brilliancy : 75 angle specular gloss was measured according to JIS P-8142.

[0027](3) Opacity : in accordance with JIS P-8138 and the A method, it measured using a hunter white color meter.

[0028](4) A degree of whiteness : according to JIS P-8123, it measured using a hunter white color meter.

[0029](5) A printing reverse side omission : using a RI-II type printing machine (made by Akira Seisakusho), the Toyo Ink TV mark V new 617 was used, and it was [amount of ink of 0.45 cc] fixed, printed, and computed with a following formula according to JIS P-8123 using a hunter white color meter.

[0030]

Back degree-of-whiteness (6) dry intensity of degree-of-whiteness-printed matter of a printing reverse-side omission (%) = blank paper: Using a RI-II type printing machine (made by Akira Seisakusho), Toyo Ink TV-24 was used, and it was [amount of ink of 0.35 cc] fixed, and printed, and relative evaluation was visually made on a picking grade of a printing surface.

[0031]O = a generation state of an exfoliation pattern of space after a coating application under O=(7) exfoliation pattern generating evaluation: with hardly generated remarkable x= generating of which **= generating is done by which it is not generated at all was judged visually.

[0032]O = relative evaluation was visually made on the generation state of boiling at the time of the coating application under O=(8) boiling generating evaluation: with hardly generated remarkable x= generating of which **= generating is done which is not generated at all.

[0033]O = relative evaluation was visually made on the unevenness of the blank paper degree

of brilliancy after the O=(9) blank-paper side-like:glazing application with hardly generated remarkable x= generating of which **= generating is done which is not generated at all.

[0034]O = -- O= which is completely uniform, [the almost uniform [Embodiment 1] major axis of 4.2 micrometers with remarkable x= unevenness with **= unevenness] As opposed to 100 copies of paints containing 80 copies of pillar-shaped precipitated calcium carbonate lights of 0.4 micrometer of minor axes, and 20 copies of lime stone powder, 1.0 copy of polyacrylic acid soda system dispersing agent was added, it distributed in water using the KAURESU distribution machine, four copies of KARUBOKISHI denaturation styrene butadiene copolymerization latex was blended with 23 copies of phosphoric ester-ized starch as adhesives, and the lower coating application liquid of 36% of solid content concentration was prepared. At this time, the B type viscosity of bottom coating application liquid was 90 mPa-s.

[0035]0.3 copy of polyacrylic acid soda system dispersing agent is added to 65 copies of lime stone powder, and 35 copies of kaolin, It distributed in water using the KAURESU distribution machine, ten copies of KARUBOKISHI denaturation styrene butadiene copolymerization latex was blended with four copies of phosphoric ester-ized starch as adhesives, and the glazing application liquid of 65% of solid content concentration was prepared. Use gate roll coater for the broad-leaved-tree-bleached-kraft-pulp independent combination stencil paper of amount [of 45g/m] of tsubos² as a coating apparatus which carries out a lower coating application, and, [a part for 1300 m/in application speed] After carrying out double-sided application dryness of 4 g/m² by solid content per one side, soft calendar processing (50 **, 80 kg/cm) was carried out.

[0036]As a coating apparatus which carries out a glazing application, fountain type blade KOTA was used and the double-sided application of 8 g/m² was carried out by solid content per one side by a part for 1300-m/in application speed. Gloss finish was carried out using a 12 more step super calender.

[0037][Embodiment 2] When preparing bottom coating application liquid, coated paper was manufactured like Embodiment 1 except having used 80 copies of needlelike precipitated calcium carbonate lights of the major axis of 4.5 micrometers, and 0.35 micrometer of minor axes manufactured in a caustification process of a kraft pulp manufacturing process. B type viscosity at this time was 130 mPa-s.

[0038][Embodiment 3] When preparing bottom coating application liquid, coated paper was manufactured like Embodiment 2 except having made concentration into 33%. B type viscosity at this time was 60 mPa-s.

[0039]The [comparative example 1] When preparing bottom coating application liquid, coated paper was manufactured like Embodiment 1 except having used 50 copies and 50 copies of lime stone powder for a pillar-shaped precipitated calcium carbonate light of the major axis of 4.2 micrometers, and 0.4 micrometer of minor axes. B type viscosity at this time was 60 mPa-

s.

[0040]The [comparative example 2] When preparing bottom coating application liquid, coated paper was manufactured like Embodiment 1 except having used 80 copies of needlelike precipitated calcium carbonate lights of the major axis of 6.0 micrometers, and 0.4 micrometer of minor axes manufactured in a caustification process of a kraft pulp manufacturing process. B type viscosity at this time was 90 mPa-s.

[0041][Comparative example 3] When preparing bottom coating application liquid, coated paper was manufactured like Embodiment 1 except having used 80 copies of spindle-shaped precipitated calcium carbonate lights of the major axis of 1.0 micrometer, and 0.15 micrometer of minor axes. The B type viscosity at this time was 200 mPa-s.

[0042][Comparative example 4] When preparing bottom coating application liquid, coated paper was manufactured like Embodiment 1 except having used 80 copies of needlelike precipitated calcium carbonate lights of the major axis of 3.2 micrometers, and 0.7 micrometer of minor axes manufactured in the caustification process of a kraft pulp manufacturing process. The B type viscosity at this time was 120 mPa-s.

[0043][Comparative example 5] When preparing bottom coating application liquid, coated paper was manufactured like Embodiment 1 except 95 copies and five copies of kaolin having used the pillar-shaped precipitated calcium carbonate light. The B type viscosity at this time was 160 mPa-s.

[0044][Comparative example 6] When preparing bottom coating application liquid, coated paper was manufactured like Embodiment 1 except having used that whose major axis of a pillar-shaped precipitated calcium carbonate light is 2.5 micrometers. The B type viscosity at this time was 140 mPa-s.

[0045][Comparative example 7] When preparing bottom coating application liquid, coated paper was manufactured like Embodiment 1 except having used that whose minor axis the major axis of a pillar-shaped precipitated calcium carbonate light is 3.2 micrometers, and is 0.15 micrometer. The B type viscosity at this time was 170 mPa-s.

[0046][Comparative example 8] When preparing bottom coating application liquid, coated paper was manufactured like Embodiment 1 except having used 80 copies of unfixed-shaped precipitated calcium carbonate lights. The B type viscosity at this time was 80 mPa-s.

[0047]The above result was shown in Table 1 and 2.

[0048]

[Table 1]

表 1

	実施例			比較例		
	1	2	3	1	2	3
軽カル形状	柱状	針状	針状	柱状	針状	紡錘状
長径 (μm)	4.2	4.5	4.5	4.2	6.0	1.0
短径 (μm)	0.4	0.35	0.35	0.4	0.4	0.15
軽カル配合細数 (部)	80	80	80	50	80	80
下塗り塗液濃度 (%)	36	36	36	36	36	36
B型粘度 (mPa・S)	90	130	60	80	90	200
白紙光沢度 (%)	60	60	59	60	59	60
不透明度 (%)	88	89	89	85	85	89
白色度 (%)	83	83	83	82	83	83
印刷裏抜け (%)	9.2	8.9	9.0	12.3	12.1	9.3
白紙面状 (%)	◎	◎	◎	◎	○	○
ドライ強度	◎	◎	◎	◎	◎	○
剝離パターン	◎	◎	◎	◎	◎	×
ボイリング	◎	◎	◎	◎	◎	×

[Table 2]

表 2

	比較例				
	4	5	6	7	8
軽カル形状	針状	柱状	柱状	柱状	不定形
長径 (μm)	3.2	4.2	2.5	3.2	—
短径 (μm)	0.7	0.4	0.4	0.15	—
軽カル配合細数 (部)	80	95	80	80	80
下塗り塗液濃度 (%)	36	36	36	36	36
B型粘度 (mPa・S)	120	160	140	170	80
白紙光沢度 (%)	59	61	59	59	59
不透明度 (%)	85	89	88	89	85
白色度 (%)	83	84	83	83	81
印刷裏抜け (%)	12.0	9.2	9.1	9.0	12.5
白紙面状 (%)	○	○	◎	◎	○
ドライ強度	◎	△	×	○	○
剝離パターン	◎	△	◎	×	◎
ボイリング	◎	△	◎	×	◎

Embodiments 1-3 are excellent a blank paper degree of brilliancy, opacity, a degree of whiteness, a printing reverse side omission, and in the shape of a blank paper side, and generating of an exfoliation pattern or boiling is not accepted at all at the time of a lower coating application so that clearly from Table 1 and 2. On the other hand, the comparative examples 1, 2, and 4 are inferior in opacity and a printing reverse side omission. The comparative example 3 has remarkable generating of an exfoliation pattern and boiling. Dry intensity is inferior and also the comparative example 5 has much generating of an exfoliation

pattern or boiling. The comparative example 6 is inferior in dry intensity. The comparative example 7 has much generating of an exfoliation pattern and boiling. The comparative example 8 is inferior in opacity, a printing reverse side omission, and a degree of whiteness. [0049]Therefore, the coated paper manufactured by this invention gives the outstanding coated paper quality which is not in the former, and the effect has a so-called size extremely. [0050]

[Effect of the Invention]The operability which poses a problem by the manufacturing process which applies lower coating application liquid on high-speed conditions can be improved using a film transfer system, and the coated paper for offset printing which was excellent in opacity, a printing reverse side omission, a degree of whiteness, and dry intensity at low cost can be provided.

[Translation done.]